

IN THE CLAIMS:

No amendments are proposed. The claims, as pending in the subject application, now read as follows:

1. (Previously presented) A method for generating a graphical object comprising a plurality of closed loops, the method comprising the steps of:

a first providing step of providing a set of one or more closed first curves defining a boundary of a surface, wherein the set of one or more closed first curves contains no self-crossover points;

a second providing step of providing a set of continuous second curves lying on the surface, wherein each of the continuous second curves intersects and crosses over one or more of the closed first curves but does not intersect other ones of the continuous second curves and wherein the set of continuous second curves contains no self-crossover points;

a first determining step of determining a set of intersection points, wherein the intersection points are those points where the one or more closed first curves intersect the continuous second curves and which lie on the boundary of the surface;

a second determining step of determining a set of crossover points from the determined set of intersection points;

an assembling step of assembling the plurality of closed loops from curve intervals, delimited by adjacent determined crossover points, from the set of one or more closed first curves and the set of continuous second curves in accordance with a predetermined rule, whereby the plurality of closed loops abuts a substantial portion of the boundary of the surface; and

a filling step of filling the plurality of closed loops with a fill to produce the graphical object.

2. (Previously Presented) A method as claimed in claim 1, wherein said assembling step comprises the substeps of:

an ordering substep of ordering the set of crossover points in accordance with a predetermined order;

a first marking substep of marking one of the crossover points that is highest in the predetermined order and that has not been previously marked;

a determining substep of determining if a last marked crossover point is a first point in a closed loop, and if so performing:

a first selecting substep of selecting a curve interval starting at the first point and terminating at an unmarked crossover point; and

a second marking substep of marking the terminating crossover point of the selected curve interval; or if not performing:

a second selecting substep of selecting a curve interval starting at the previous terminating crossover point and terminating at an unmarked crossover point; and

a third marking substep of marking the current terminating crossover point of the selected curve interval;

a first repetition substep of repetitively performing the determining substep until the closed loop is formed; and

a second repetition substep of repetitively performing the first marking, determining and the first repetition substeps until all possible closed loops have been formed.

3. (Previously Presented) A method as claimed in claim 2, wherein when it is determined in said determining substep that the last marked crossover point is a first point in a closed loop, the curve interval is selected from the set of one or more closed first curves, wherein the selected curve interval starts at the first point, continues in a first direction, and terminates at a next adjacent unmarked crossover point.

4. (Previously Presented) A method as claimed in claim 3, wherein when it is determined in said determining substep that the last marked crossover point is not a first point in a closed loop, the curve interval is selected from the set of one or more closed first curves or the set of continuous second curves, wherein the selected curve interval is the first curve interval encountered around the last marked crossover point in a second direction starting from the previously selected curve interval and which continues in a third direction and terminates at a next adjacent unmarked crossover point.

5. (Previously Presented) A method as claimed in claim 4, wherein said substep of ordering the set of crossover points comprises ordering the crossover points according to their position along the set of one or more closed first curves in a fourth direction.

6. (Previously Presented) A method as claimed in claim 5, wherein the first direction and the fourth direction are in a forward direction, the third direction is either in a positive or a negative direction, and the second direction is in the same direction as a backward direction.

7. (Previously Presented) A method as claimed in claim 5, wherein the first direction and the fourth direction are in a backward direction, the third direction is either in a positive or a negative direction, and the second direction is in the same direction as a forward direction.

8. (Previously Presented) A method as claimed in claim 1, wherein the surface is a 2-dimensional surface.

9. (Previously Presented) A method as claimed in claim 1, wherein the surface is a 3-dimensional surface.

10. (Previously Presented) A method as claimed in claim 1, wherein said filling step comprises filling the plurality of closed loops with a predetermined color.

11. (Previously presented) A method as claimed in claim 1, wherein said second step of providing a set of continuous second curves, comprises the substep of generating the set of continuous second curves.

12. (Previously presented) A method as claimed in claim 1, wherein said second step of providing a set of continuous second curves, comprises the substep of accessing the set of continuous second curves from storage.

13. (Previously presented) A method as claimed in claim 1, wherein said second step of providing a set of continuous second curves, comprises the substep of selecting one of a plurality of sets of continuous second curves in response to user input.

14. (Previously Presented) A method as claimed in claim 11, wherein said generating substep comprises inputting parameters.

15. (Previously Presented) A method as claimed in claim 14, wherein the input parameters comprise one or more of the following: base shapes of the continuous second curves, a period of the continuous second curves, and an amplitude of the continuous second curves.

16. (Previously Presented) A method as claimed in claim 15, wherein the amplitude of the continuous second curves varies throughout.

17. (Previously Presented) A method as claimed in claim 1, wherein the set of one or more closed first curves constitutes a character glyph of a font.

18. (Previously presented) An apparatus for generating a graphical object comprising a plurality of closed loops, the apparatus comprising:

first providing means for providing a set of one or more closed first curves defining a boundary of a surface, wherein the set of one or more closed first curves contains no self-crossover points;

second providing means for providing a set of continuous second curves lying on the surface, wherein each of the continuous second curves intersects and crosses over one or more of the closed first curves but does not intersect other ones of the continuous second curves and wherein the set of continuous second curves contains no self-crossover points;

first determining means for determining a set of intersection points, wherein the intersection points are those points where the one or more closed first curves intersect the continuous second curves and which lie on the boundary of the surface;

second determining means for determining a set of crossover points from the set of intersection points;

assembling means for assembling the plurality of closed loops from curve intervals, delimited by adjacent determined crossover points, from the set of one or more closed first curves and the set of continuous second curves in accordance with a predetermined rule, whereby the plurality of closed loops abuts a substantial portion of the boundary of the surface; and

filling means for filling the plurality of closed loops with a fill to produce the graphical object.

19. (Previously Presented) An apparatus as claimed in claim 18, wherein said assembling means comprises:

ordering means for ordering the set of crossover points in accordance with a predetermined order;

first marking means for marking one of the crossover points that is highest in the predetermined order and that has not been previously marked;

first selecting means for selecting a curve interval starting at a first point and terminating at an unmarked crossover point;

second marking means for marking the terminating crossover point of the selected curve interval;

second selecting means for selecting a curve interval starting at the previous terminating crossover point and terminating at an unmarked crossover point;

third marking means for marking the current terminating crossover point of the selected curve interval;

third determining means for determining if a last marked crossover point is the first point in a closed loop, and if so performing the operations of said first selecting means and said second marking means, or if not, performing the operations of said second selecting means and said third marking means;

means for repetitively performing the operations of said third determining means until the closed loop is formed; and

means for repetitively performing the operations of said first marking means and said third determining means until all possible closed loops have been formed.

20. (Previously Presented) An apparatus as claimed in claim 19, wherein said first selecting means selects the curve interval from the set of one or more closed first curves, wherein the selected curve interval starts at the first point, continues in a first direction, and terminates at a next adjacent unmarked crossover point.

21. (Previously Presented) An apparatus as claimed in claim 20, wherein said second selecting means selects the curve interval from the set of one or more closed first curves or the set of continuous second curves, wherein the selected curve interval is the first curve interval encountered around the last marked crossover point in a second direction starting from the previously selected curve interval and which continues in a third direction and terminates at a next adjacent unmarked crossover point.

22. (Previously Presented) An apparatus as claimed in claim 21, wherein said ordering means orders the set of crossover points according to their position along the set of one or more closed first curves in a fourth direction.

23. (Previously Presented) An apparatus as claimed in claim 22, wherein the first direction and the fourth direction are in a forward direction, the third direction is either in a positive or a negative direction, and the second direction is in the same direction as a backward direction.

24. (Previously Presented) An apparatus as claimed in claim 22, wherein the first direction and the fourth direction are in a backward direction, the third direction is either in a positive or a negative direction, and the second direction is in the same direction as a forward direction.

25. (Previously Presented) An apparatus as claimed in claim 18, wherein the surface is a 2-dimensional surface.



26. (Previously Presented) An apparatus as claimed in claim 18, wherein the surface is a 3-dimensional surface.

27. (Previously Presented) An apparatus as claimed in claim 18, wherein said filling means comprises means for filling the plurality of closed loops with a predetermined color.

28. (Currently Amended) An apparatus as claimed in claim 18, wherein said second providing means comprises means for generating the set of continuous second curves.

29. (Previously presented) An apparatus as claimed in claim 18, wherein said second providing means comprises means for accessing the set of continuous second curves from storage.

30. (Previously presented) An apparatus as claimed in claim 18, wherein said second providing means comprises means for selecting one of a plurality of sets of continuous second curves in response to user input.

31. (Previously Presented) An apparatus as claimed in claim 28, wherein said generating means comprises means for inputting parameters.

32. (Previously Presented) An apparatus as claimed in claim 31, wherein the input parameters comprise one or more of the following: base shapes of the continuous second

curves, a period of the continuous second curves, and an amplitude of the continuous second curves.

33. (Previously Presented) An apparatus as claimed in claim 32, wherein the amplitude of the continuous second curves varies throughout.

34. (Previously Presented) An apparatus as claimed in claim 18, wherein the set of one or more closed first curves constitutes a character glyph of a font.

35. (Previously presented) A computer program product comprising a computer readable medium including a computer program for generating a graphical object comprising a plurality of closed loops, the computer program product comprising:

first providing means for providing a set of one or more closed first curves defining a boundary of a surface, wherein the set of one or more closed first curves contains no self-crossover points;

second providing means for providing a set of continuous second curves lying on the surface, wherein each of the continuous second curves intersects and crosses over one or more of the closed first curves but does not intersect other ones of the continuous second curves and wherein the set of continuous second curves contains no self-crossover points;

first determining means for determining a set of intersection points, wherein the intersection points are those points where the one or more closed first curves intersect the continuous second curves and which lie on the boundary of the surface;

second determining means for determining a set of crossover points from the set of intersection points;

assembling means for assembling the plurality of closed loops from curve intervals, delimited by adjacent determined crossover points, from the set of one or more closed first curves and the set of continuous second curves in accordance with a predetermined rule, whereby the plurality of closed loops abuts a substantial portion of the boundary of the surface; and

filling means for filling the plurality of closed loops with a fill to produce the graphical object.

36. (Previously Presented) A computer program product as claimed in claim 35, wherein said assembling means comprises:

ordering means for ordering the set of crossover points in accordance with a predetermined order;

first marking means for marking one of the crossover points that is highest in the predetermined order and that has not been previously marked;

first selecting means for selecting a curve interval starting at a first point and terminating at an unmarked crossover point;

second marking means for marking the terminating crossover point of the selected curve interval;

second selecting means for selecting a curve interval starting at the previous terminating crossover point and terminating at an unmarked crossover point;

third marking means for marking the current terminating crossover point;

third determining means for determining if the last marked crossover point is the first point in a closed loop, and if so performing the operations of said first selecting means and said second marking means, or if not, performing the operations of said second selecting means and said third marking means;

means for repetitively performing the operations of said third determining means until the closed loop is formed; and

means for repetitively performing the operations of said first marking means and said third determining means until all possible closed loops have been formed.

37. (Previously Presented) A computer program product as claimed in claim 36, wherein said first selecting means selects the curve interval from the set of one or more closed first curves, wherein the selected curve interval starts at the first point, continues in a first direction, and terminates at a next adjacent unmarked crossover point.

38. (Previously Presented) A computer program product as claimed in claim 37, wherein said second selecting means selects the curve interval from the set of one or more closed first curves or the set of continuous second curves, wherein the selected curve interval is the first curve interval encountered around the last marked crossover point in a second direction starting from the previously selected curve interval and which continues in a third direction and terminates at a next adjacent unmarked crossover point.

39. (Previously Presented) A computer program product as claimed in claim 38, wherein said ordering means orders the set of crossover points according to their position along the set of one or more closed first curves in a fourth direction.

40. (Previously Presented) A computer program product as claimed in claim 39, wherein the first direction and the fourth direction are in a forward direction, the third direction is either in a positive or a negative direction, and the second direction is in the same direction as a backward direction.

41. (Previously Presented) A computer program product as claimed in claim 39, wherein the first direction and the fourth direction are in a backward direction, the third direction is either in a positive or a negative direction, and the second direction is in the same direction as a forward direction.

42. (Previously Presented) A computer program product as claimed in claim 35, wherein the surface is a 2-dimensional surface.

43. (Previously Presented) A computer program product as claimed in claim 35, wherein the surface is a 3-dimensional surface.

44. (Previously Presented) A computer program product as claimed in claim 35, wherein said filling means comprises means for filling the plurality of closed loops with a predetermined color.

45. (Previously presented) A computer program product as claimed in claim 35, wherein said second providing means comprises means for generating the set of continuous second curves.

46. (Previously presented) A computer program product as claimed in claim 35, wherein said second providing means comprises means for retrieving the set of continuous second curves from storage.

47. (Previously presented) A computer program product as claimed in claim 35, wherein said second providing means comprises means for selecting one of a plurality of sets of continuous second curves in response to user input.

48. (Previously Presented) A computer program product as claimed in claim 45, wherein said generating means comprises means for inputting parameters.

49. (Previously Presented) A computer program product as claimed in claim 48, wherein said input parameters comprise one or more of the following: base shapes of the continuous second curves, a period of the continuous second curves, and an amplitude of the continuous second curves.

50. (Previously Presented) A computer program product as claimed in claim 49, wherein the amplitude of the continuous second curves varies throughout.

51. (Previously Presented) A computer program product as claimed in claim 35, wherein the set of one or more closed first curves constitutes a character glyph of a font.

52. (Previously presented) A method of modifying a typeface, font, or character, the method comprising the steps of:

a first providing step of providing a set of one or more closed first curves defining a boundary of a surface of the typeface, font, or character, wherein the set of one or more closed first curves contains no self-crossover points;

a second providing step of providing a set of continuous second curves lying on the surface, wherein each of the continuous second curves intersects and crosses over one or more of the closed first curves but does not intersect other ones of the continuous second curves and wherein the set of continuous second curves contains no self-crossover points;

a first determining step of determining a set of intersection points, wherein the intersection points are those points where the one or more closed first curves intersect the continuous second curves and which lie on the boundary of the surface;

a second determining step of determining a set of crossover points from the determined set of intersection points;

an assembling step of assembling a plurality of closed loops from curve intervals, delimited by adjacent determined crossover points, from the set of one or more closed first curves and the set of continuous second curves in accordance with a predetermined rule, whereby the plurality of closed loops abuts a substantial portion of the boundary of the surface; and

a filling step of filling the plurality of closed loops with a fill to form the modified typeface, font, or character.

53. (Previously presented) An apparatus for modifying a typeface, font, or character, the apparatus comprising:

first providing means for providing a set of one or more closed first curves defining a boundary of a surface of the typeface, font, or character, wherein the set of one or more closed first curves contains no self-crossover points;

second providing means for providing a set of continuous second curves lying on the surface, wherein each of the continuous second curves intersects and crosses over one or more of the closed first curves but does not intersect other ones of the continuous second curves and wherein the set of continuous second curves contains no self-crossover points;

means for determining a set of intersection points, wherein the intersection points are those points where the one or more closed first curves intersect the continuous second curves and which lie on the boundary of the surface;

means for determining a set of crossover points from the set of intersection points;

assembling means for assembling a plurality of closed loops from curve intervals, delimited by adjacent determined crossover points, from the set of one or more closed first curves and the set of continuous second curves in accordance with a predetermined rule, whereby the plurality of closed loops abuts a substantial portion of the boundary of the surface; and

filling means for filling the plurality of closed loops with a fill to form the modified typeface, font, or character.

54. (Previously presented) A computer program product comprising a computer readable medium including a computer program for modifying a typeface, font, or character, the computer program product comprising:



first providing means for providing a set of one or more closed first curves defining a boundary of a surface of the typeface, font, or character, wherein the set of one or more closed first curves contains no self-crossover points;

second providing means for providing a set of continuous second curves lying on the surface, wherein each of the continuous second curves intersects and crosses over one or more of the closed first curves but does not intersect other ones of the continuous second curves and wherein the set of continuous second curves contains no self-crossover points;

means for determining a set of intersection points, wherein the intersection points are those points where the one or more closed first curves intersect the continuous second curves and which lie on the boundary of the surface;

means for determining a set of crossover points from the set of intersection points;

assembling means for assembling a plurality of closed loops from curve intervals, delimited by adjacent determined crossover points, from the set of one or more closed first curves and the set of continuous second curves in accordance with a predetermined rule, whereby the plurality of closed loops abuts a substantial portion of the boundary of the surface; and

filling means for filling the plurality of closed loops with a fill to form the modified typeface, font, or character.

55. (Previously presented) A method of modifying a typeface, font, or character, the method comprising the steps of:

providing a set of one or more closed first curves defining a boundary of a surface of the typeface, font, or character, wherein the set of one or more closed first curves contains no self-crossover points;

providing a set of continuous second curves lying on the surface, wherein each of the continuous second curves intersects and crosses over one or more of the closed first curves but does not intersect other ones of the continuous second curves and wherein the set of continuous second curves contains no self-crossover points;

determining a set of intersection points, wherein the intersection points are those points where the one or more closed first curves intersect the continuous second curves and which lie on the boundary of the surface;

determining a set of crossover points from the set of intersection points;

selecting unmarked adjacent crossover points from the set of determined crossover points to form a closed loop;

marking the selected adjacent crossover points;

repetitively performing the selecting and marking steps until a set of closed loops have been formed, wherein the set of closed loops abuts a substantial portion of the boundary of the surface; and

filling the set of closed loops with a fill to form the modified typeface, font, or character.

56. (Previously presented) Apparatus for modifying a typeface, font, or character, the apparatus comprising:

means for providing a set of one or more closed first curves defining a boundary of a surface of the typeface, font, or character, wherein the set of one or more closed first curves contains no self-crossover points;

means for providing a set of continuous second curves lying on the surface, wherein each of the continuous second curves intersects and crosses over one or more of the closed first curves but does not intersect other ones of the continuous second curves and wherein the set of continuous second curves contains no self-crossover points;

means for determining a set of intersection points, wherein the intersection points are those points where the one or more closed first curves intersect the continuous second curves and which lie on the boundary of the surface;

means for determining a set of crossover points from the set of intersection points;

means for selecting unmarked adjacent crossover points from the set of determined crossover points to form a closed loop;

means for marking the selected adjacent crossover points;

means for repetitively performing the operations of said selection means and said marking means until a set of closed loops have been formed, wherein the set of closed loops abuts a substantial portion of the boundary of the surface; and

means for filling the set of closed loops with a fill to form the modified typeface, font, or character.

57. (Previously presented) A computer program product comprising a computer readable medium including a computer program for modifying a typeface, font, or character, the computer program product comprising:

means for providing a set of one or more closed first curves defining a boundary of a surface of the typeface, font, or character, wherein the set of one or more closed first curves contains no self-crossover points;

means for providing a set of continuous second curves lying on the surface, wherein each of the continuous second curves intersects and crosses over one or more of the closed first curves but does not intersect other ones of the continuous second curves and wherein the set of continuous second curves contains no self-crossover points;

means for determining a set of intersection points, wherein the intersection points are those points where the one or more closed first curves intersect the continuous second curves and which lie on the boundary of the surface;

means for determining a set of crossover points from the set of intersection points;

means for selecting unmarked adjacent crossover points from the set of determined crossover points to form a closed loop;

means for marking the selected adjacent crossover points;

means for repetitively performing the operations of said selection means and said marking means until a set of closed loops have been formed, wherein the set of closed loops abuts a substantial portion of the boundary of the surface; and

means for filling the set of closed loops with a fill to form the modified typeface, font, or character.

58. (Previously presented) A method for generating a graphical object comprising a plurality of closed loops by transforming a set of closed first curves defined on a surface, the method comprising the steps of:

providing a pattern comprising a set of continuous second curves that intersect the set of closed first curves upon the surface, wherein each continuous second curve does not intersect other ones of the continuous second curves;

determining crossover points of the intersections of the set of closed first curves and the set of continuous second curves;  
generating closed loops in accordance with the determined crossover points, wherein the closed loops abut a substantial portion of the boundary of the surface; and  
filling the closed loops with a predetermined color to produce the graphical object.

59. (Previously presented) An apparatus for generating a graphical object comprising a plurality of closed loops by transforming a set of closed first curves defined on a surface, the apparatus comprising:

means for providing a pattern comprising a set of continuous second curves that intersect the set of closed first curves upon the surface, wherein each continuous second curve does not intersect other ones of the continuous second curves;

means for determining crossover points of the intersections of the set of closed first curves and the set of continuous second curves;

means for generating closed loops in accordance with the crossover points, wherein the closed loops abut a substantial portion of the boundary of the surface; and

means for filling the closed loops with a predetermined color to produce the graphical object.

60. (Previously presented) A computer program product comprising a computer readable medium including a computer program for generating a graphical object comprising a

plurality of closed loops by transforming a set of closed first curves defined on a surface, the computer program product comprising:

means for providing a pattern comprising a set of continuous second curves that intersect the set of closed first curves upon the surface, wherein each continuous second curve does not intersect other ones of the continuous second curves;

means for determining crossover points of the intersections of the set of closed first curves and the set of continuous second curves;

means for generating closed loops in accordance with the crossover points, wherein the closed loops abut a substantial portion of the boundary of the surface; and

means for filling the closed loops with a predetermined color to produce the graphical object.